From (5)+(7), $2am^2n^2-9bn^4-2abn^2=ab^2+a^2b$ ....(9).

Subtracting (9) from (8), $2abn^2=2ab(b-a)$. Whence $b-a=n^2$.

Factoring (8), $n^2(2am^2-3bn^2)=ab(b-a)$. Whence $2am^2-3bn^2=ab$.

Put $2a=n$ and by easy reduction we have $2m^2=b(6n+1)$. Since $\frac{1}{2}(6n+1)$ cannot be a square $b/2$ must be a square to make an integral. Then $m^2=b/2(6n+1)$ is $(n^2+\frac{1}{2}n)/2\times(6n+1)$. $n=4$ being the only value that will make both factors a square, $m=\sqrt{[(n^2+\frac{1}{2}n)/2]}\times\sqrt{(6n+1)}=15$.

$\therefore$ $x=241$, $y=269$, $z=149$, $p=329$, $q=89$, $r=191$.

PROBLEMS FOR SOLUTION.

ARITHMETIC.

106. Proposed by ELMER SCHUYLER, High Bridge. N. J.

What is the amount of $1000 at compound interest for 3 years at 6%, if it be compounded every instant?

107. Proposed by R. V. ALLEN, Hooker Station, Ohio.

A barn, $ABCD$, length $AB=b$ feet, width $AD=a$ feet, standing in an open field, has a horse tethered to a point, P, in the side, AB, distance $AP=c$ feet, with a rope R feet long. Over what area can the horse graze?

*** Solutions of these problems should be sent to B. F. Finkel, not later than March 10.

ALGEBRA.

94. Proposed by J. W. YOUNG, Columbus, Ohio.

Solve: $\left[\frac{x^2+14x+1}{p^4+14p^2+1}\right]^3=\frac{x(x-1)^4}{p^2(p^2-1)^4}$.

Burnside and Panton's *Theory of Equations*, page 148, ex. 17.

95. Proposed by SYLVESTER ROBINS, North Branch Depot, N. J.

Substitute *numbers* in place of the letters in the following pattern: ..... $\Delta=\sqrt{81^2a^2b^2c^2}=81abc$..... b^2+c^2, a^2+c^2, a^2+b^2; and compute the areas and sides of the whole nest of integral, rational triangles.

*** Solutions of these problems should be sent to J. M. Colaw, not later than March 10.

GEOMETRY.

114. Proposed by WILLIAM HOOVER, A. M., Ph. D., Professor of Mathematics and Astronomy, Ohio State University, Athens, Ohio.

If a variable ellipse hyperosculate a fixed ellipse at the extremity of the minor axis, the locus of the foci is a circle whose diameter is equal to the radius of curvature.